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PERSPECTIVE TAKING IN CHILDREN'S DRAWINGS OF BALLS

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INTRODUCTION

A variety of studies discussed mentality-reality distinction, because their interest has been in supposing that children must distinguish between children's internal thoughts and the events of the external physical world in order to free children from egocentrism.

Flavell and his co-workers (Flavell, 1974; 1978; Masangkay et al., 1974) suppose that there are at least two developmental levels of knowledge concerning visual perception. At Level 1, children can only distinct whether someone does or does not see the same object as they do. At Level 2, children further infer their interpretations of the object could not be the same as others' if their viewing circumstances differ. According to this proposition, children first getting to understand others may not always see the same objects as the children currently see. Then they get to understand others have different visual perspectives of the same object (Flavell, 1974). However, most researches on visual perspective taking, investigate their response linguistically.

Recent researches on drawings illustrate that children's errors come not only from their graphic skill (Freeman & Janikoun, 1972; Phipps et al., 1978). To research children's drawings should be effective if they reflect children's perspectives.

The present experiment was designed to investigate, using drawing tasks that don't require much graphic skill from the children. This experiment would also show that children get to understand what others see may be different from them, and how they interpret what others see, developmentally.

METHOD

Subject

Children from a public nursery school and a private kindergarten were used. Thirty-three children aged 3, thirty-eight children aged 4, and forty-three children aged 5 participated. Approximately one-half of the children of each age group were female.

Stimuli

A ball 7cm in diameter was used. Two colors divided the ball into halves. One color was red. The other was blue. The child drew 3 pictures of the ball on papers put on the desk in front of him/her. Twelve-color-crayons and three papers were used

for drawings of each child.

Procedure

Children were taken individually to a room in the school or the kindergarten. After establishing rapport, the experimenter showed the ball. Each child was first asked what colors were on the ball and which crayons corresponded to the colors on the ball. After confirming that the child knew that the ball had two colors on it, the experimenter showed the ball so that only the half of the ball painted in red could be seen by the child. Each child was then asked to draw the ball three times after following instructions; 1) how it is seen by the child (seeing-drawing); 2) how it is seen by the experimenter (opposite-seeing-drawing); 3) how it is seen by the child that is sitting left side to the child (side-seeing-drawing).

RESULT

Drawings were classified as correct if a red circle was drawn in the picture that meant how the ball was seen by the child, if a blue circle was drawn in the picture that meant how the ball was seen by the experimenter, and if a circle, whose left semicircle was red and whose right semicircle was blue, was drawn in the picture that meant how the ball was seen by the child.

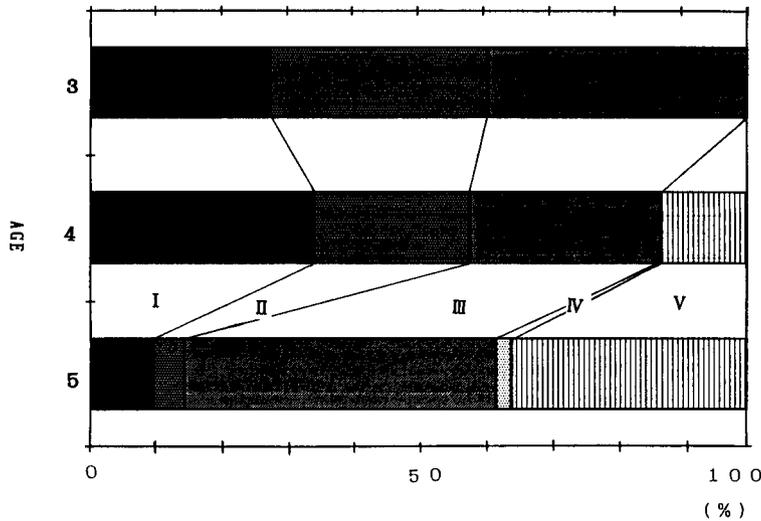
Table 1 shows the number of children at each age level who were categorized as correct and error. The number of children classified as correct in each condition increased according to ages (seeing drawing: $\chi^2=7.18$, $df=2$, $p<.05$; opposite-seeing-drawing: $\chi^2=12.53$, $df=2$, $p<.01$; side-seeing-drawing: $\chi^2=14.62$, $df=2$, $p<.01$).

Drawings classified as correct for the picture from the child were analyzed to investigate how their perspectives of others were. McNemer test for correlated proportions was used to examine the significance of the difference in the correct proportions for the number of opposite-seeing-drawing and of side-seeing-drawing for each age group. All differences are significant (aged 3: $z=3.33$, $p<.01$; aged 4: $z=3.02$, $p<.01$; aged 5: $z=3.93$, $p<.01$). This means that to draw a picture as it is seen to the child from the opposite side is easier than to draw a picture as it is seen from the side of the child. (See fig. 1)

The number of children at each level who were categorized the error patterns is shown in Table 2. Incorrect drawings of opposite-seeing-drawings in the groups aged 3 and aged 4 were effected by the seeing of the child, not so for those aged 5 ($\chi^2=2.80$,

TABLE 1
Number of Children at each level showing correct and error drawing

	Age	3	4	5	Total
Seeing-drawing	Correct	24	25	38	87
	Error	9	13	4	26
Opposite-seeing-drawing	Correct	13	16	36	65
	Error	20	22	6	26
Side-seeing-drawing	Correct	0	7	18	25
	Error	33	31	24	88



- I : Children who made no correct drawing
- II : Children who made correct dawing to only seeing-drawing
- III : Children who made correct drawings to seeing-drawing and oppsite-seeing-drawing
- IV : Children who made correct drawings to seeing-drawing and side-seeing-drawing
- V : Children who made correct drawings to all

Fig. 1 Proportion of children showing consistent correct response

TABLE 2

Number of children at age level showing error drawing patterns

Opposite-seeing-drawing	Age	3	4	5
same drawing as seeing-drawing		6	5	0
etc.		5	4	3
Side-seeing-drawing	Age	3	4	5
same drawing as seeing-drawing		11	9	1
same drawing as opposite-drawing		7	2	0
reverse (left/right)		3	7	11
reverse (up/down)		0	0	5
etc.		2	2	5

df=2, p<.05.). Incorrect drawings of side-seeing-drawing in the groups aged 3 and aged 4 were effected by the seeing of the child or by the seeing of experimenter, not so for those of aged 5 ($\chi^2=30.61$, df=2, p<.05).

Most of children who categorized as error drew either a circle whose left semicircle was blue and whose right semicircle was red, or a circle in which the one semicircle was upside and the other was downside.

DISCUSSION

The result, which corrects proportions of both seeings of others, increases as they grow, and suggests that understanding of others' seeings is promoted as the children grow.

Analyzing of incorrect responses, the result showed many of children who responded incorrectly to opposite-seeing-drawing, responded incorrectly to side-seeing-drawing, but few of the children who responded incorrecoly to side-seeing-drawing responded incorrectly to opposite-seeing-drawing. This suggests that inferencing seeing of the opposite is easier than that of the side. It would be possible for factors of either (real person or not) or where the other is (opposite or side to the child) as well as the factor of how many colors the other sees.

Children may come to understand other's seeings are different from their first seeings, then come to understand how others see the same object they see. Also it may be possible to infer how the other sees, who is the other, and where is the other for children. This might be important.

Drawings of children aged 3 and 4 that were not correct for opposite-seeing-drawing showed misleading representation effected by their own seeing, and side-seeing-drawings were effected by either their own seeing or oppsite seeing. However, neither opposite-seeing-drawing nor side-seeing-drawing of children aged 5 were effected by seeing of anyone, rather those seems to be errors in their expression on the papers. Many of the incorrect responses by children aged 5 to side-seeing-drawing showed the ball left semicircle blue and right semicircle red. These results suggest children aged 3 and 4 are on the way to understand other's seeing. They could understand other's seeing was different from their seeing, but could not understand how others see. As contrasted to it, children aged 5 seem to understand other's seeing is different from their seeing and they understand how others see, but they could not completely understand their view.

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